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Forest Pest Management
Methods Application Group

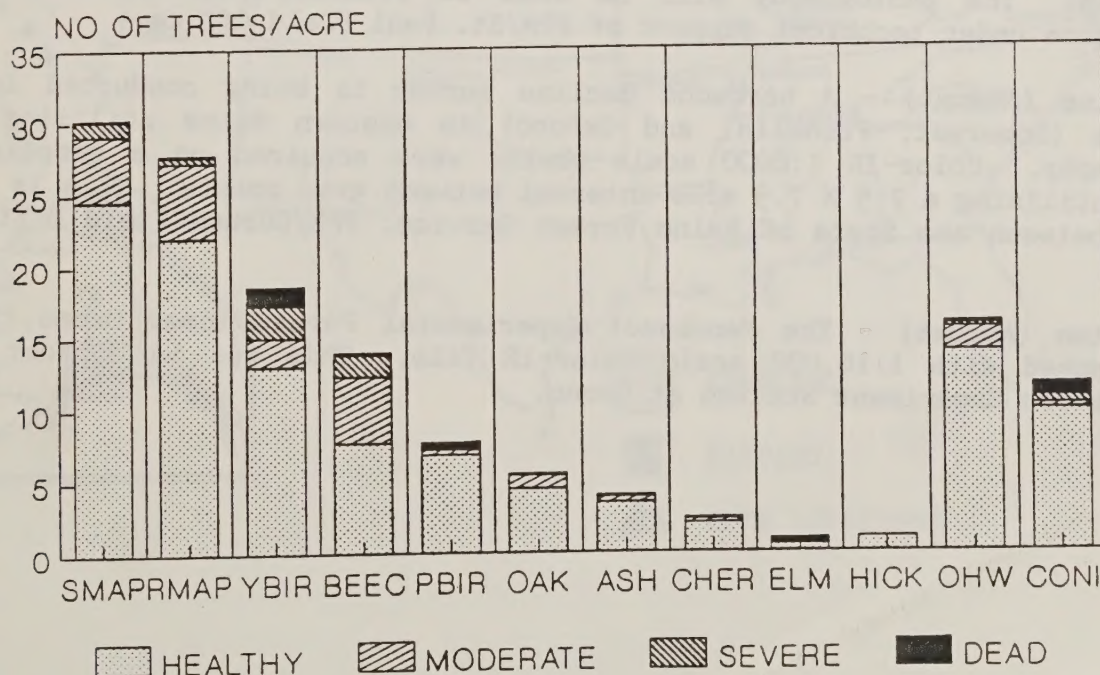
TECHNOLOGY UPDATE

Issue No. 88-01
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VERMONT HARDWOOD HEALTH SURVEY IS COMPLETED - The statewide hardwood health survey for the State of Vermont conducted through cooperative efforts of the State of Vermont, Northeastern Area FPM, and MAG has been completed. Results of the survey are documented in a final report that is to be issued by the State of Vermont in the near future.

Results of the survey indicate that the amount of mortality (number of trees and volume) is similar to that reported in past surveys. Dominant/codominant hardwood trees averaged 77 percent healthy, 16 percent moderately declining, and 5 percent severely declining. Number of dominant/codominant trees dead is estimated at 3 trees/acre for all hardwoods and 4 trees/acre for all species within hardwood stands. The bar chart is a graphic representation of Vermont hardwood health condition. For further information, contact Bov Eav at FTS-323-1784 or 303-224-1784.



FPM/MAG NATIONWIDE AERIAL PHOTO PROGRAM - The photo program has concluded its aerial photography acquisition for 1987. Photo missions ranged from mapping to sampling photography for a variety of management problems in locations from coast-to-coast (see accompanying map).

1 - California/Oregon (May) - Large scale (1:4000, 1:6000, and 1:8000) color and color-IR photography was acquired over nine locations containing Port Orford cedar on the Six Rivers National Forest (CA) and the Siskiyou National Forest (OR). The photography will be used to develop photo interpretation guides for identifying cedar, and evaluating decline and mortality associated with a root fungus. This is a joint effort between the National Forestry Applications Program (NFAP) and MAG.

2 - Alaska (June) - A variety of photo missions were planned in South Central Alaska and on the Kenai Peninsula to support the Forest Inventory and Analysis Project (FIA) of Pacific Northwest Experiment Station, FPM/Region 10, and the Chugach National Forest/Region 10. FIA inventory plots on the Kenai Peninsula will be used to assess the spruce beetle activity in that area. Due to bad weather (worst recorded in the last 20 years) only a small portion of the planned work was accomplished.

3 - Wisconsin (July) - A survey is being conducted over a 19 county area in northern Wisconsin to evaluate decline and mortality of sugar maple and other northern hardwoods. Color-IR photography at a scale of 1:8000 was acquired at 200 sample point locations within the 19 county area. This area was divided into four pH zones that will be evaluated for the occurrence of maple decline and mortality under different levels of precipitation pH. This is a cooperative survey between the Wisconsin Department of Natural Resources, FPM/St. Paul Field Office, MAG, and NFAP.

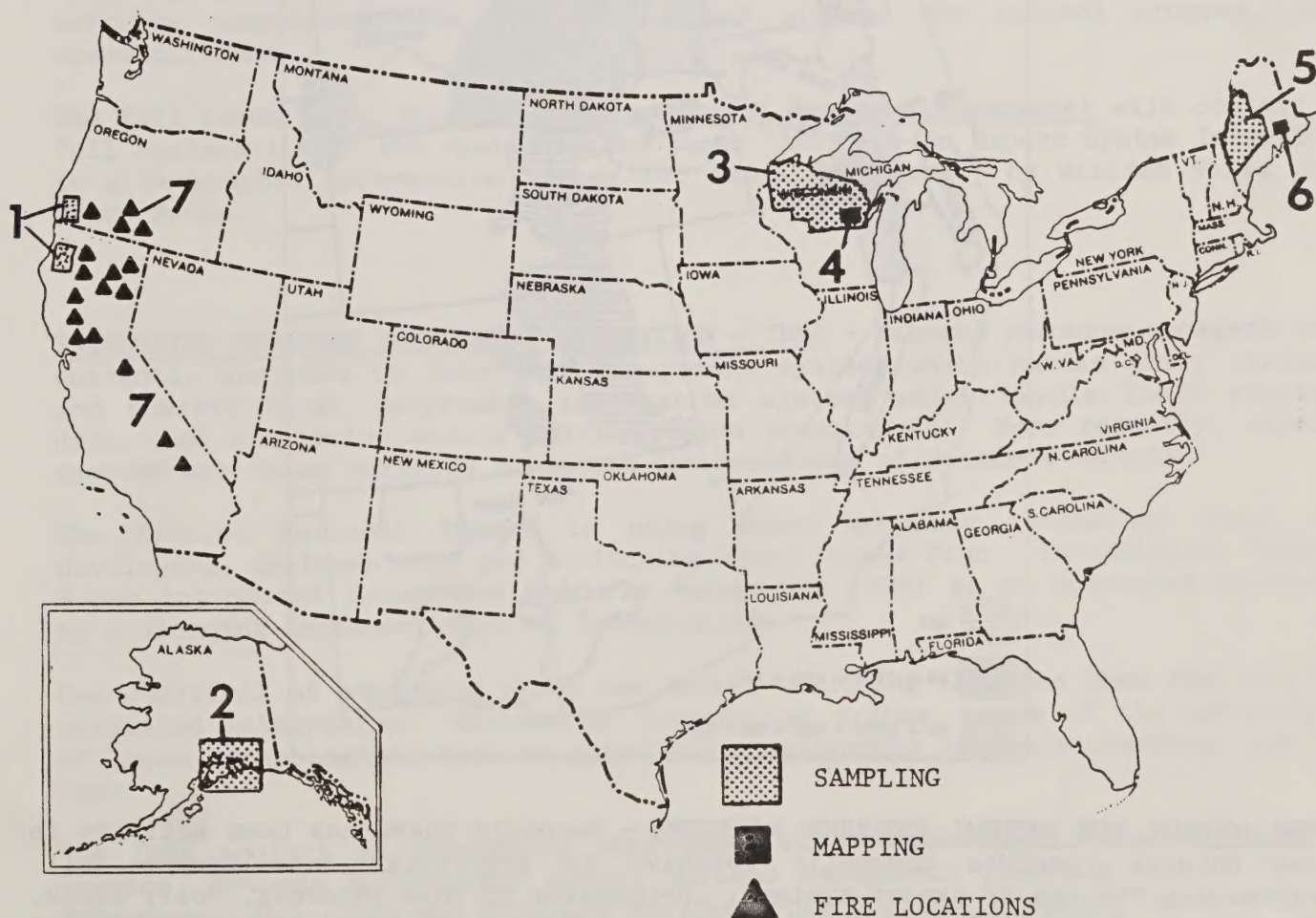
4 - Wisconsin (July) - At the request of the Bureau of Indian Affairs, 1:16,000 color-IR photography was acquired of the Menominee Indian Reservation in Wisconsin. The photography will be used to evaluate pest problems on the reservation under technical support of FPM/St. Paul Field Office.

5 - Maine (August) - A hardwood decline survey is being conducted in three counties (Somerset, Franklin, and Oxford) in western Maine utilizing aerial photography. Color-IR 1:8000 scale photos were acquired on a sampling grid design utilizing a 7.5 X 7.5 mile interval between grid points. This is a joint effort between the State of Maine Forest Service, FPM/Durham Field Office, and MAG.

6 - Maine (August) - The Penobscot Experimental Forest (near Orono, ME) was photographed with 1:16,000 scale color-IR film. This was in support of the Northeastern Experiment Station at Orono.

7 - California/Oregon (September-October) - A special aerial photo task force was formed to acquire aerial photo coverage of the many fires (burned areas) in California and Oregon. Photo crews from Regions 1 and 6, and MAG contributed to the photo acquisition operations under the coordination of R-6 Engineering. The MAG crew photographed over 1300 linear miles of flight line over burned areas using Aerocolor Negative film at scales of 1:12,000 and 1:16,000. In Oregon the MAG crew flew missions on the Siskiyou National Forest and three BLM fires. In California they flew on the Klamath, Mendocino, Modoc, Sequoia, Shasta-Trinity, and Stanislaus National Forests.

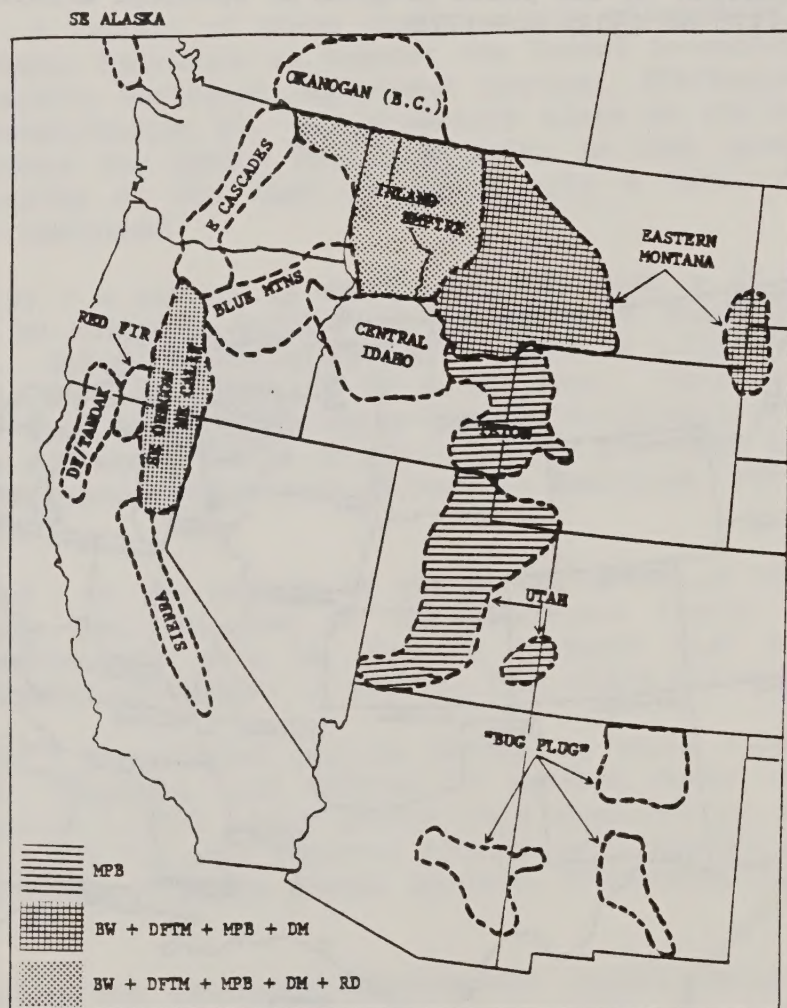
For further information on the photo program or specific missions, contact Dick Myhre at FTS 323-1778 or (303) 224-1778.



STATUS OF PEST MODELS - Prognosis growth and yield model is used extensively in the inland west to predict forest stand development under various management options through time.

Combined Prognosis-pest models allow integration of pest effects into forest management prescriptions. MAG maintains 3 insect pest models (Douglas-fir tussock moth, mountain pine beetle, and western spruce budworm) and the western root disease model at the Fort Collins Computer Center (FCCC). In addition the WO-TM detached unit at Fort Collins developed and maintains the dwarf mistletoe model at FCCC. These pest models are linked to several variants of the Prognosis growth and yield model (see map).

Requests to expand the geographic coverage of any of these pest models can be made through regional FPM units. For further information, contact Bov Eav at FTS-323-1784 or 303-224-1784.



NEW JOURNAL FOR NATURAL RESOURCE MANAGERS - Recently there has been activity in the natural resource community relative to artificial intelligence (AI), especially the use of expert systems. Responding to this interest, Molly Stock, Department of Forest Resources, University of Idaho, initiated a new journal, AI Applications in Natural Resource Management. In the first issue of Molly's paper "AI and Expert Systems: An Overview" presents a concise and easy to understand overview of these subjects. If you are interested in learning more about AI and keeping up with related AI activities in natural resource management, this new journal is worth your time and the expense (\$45/year, published quarterly).

IPIAS BECOMES INFORMS - The developers of the Integrated Pest Impact Assessment System (IPIAS) have selected a new name to reflect the system's broad application capabilities.

INFORMS, Integrated Forest Resource Management System, will be introduced by way of a new video "Advanced Technologies--New Tools for Old Challenges" which will be ready for distribution in December.

The purpose of this video is to demonstrate the integration of Forest Pest Management recommendations with the planning and management of National Forest resources. This 15 minute narrated film is designed to arouse the interest of forest and other land managers who must deal with pest problems in a multiple resource management context.

ASPENEX PUBLISHED IN NEW AI JOURNAL - ASPENEX is a prototype system operating on the Nicolet National Forest that automates analysis of aspen stand site characteristics by integrating a knowledge base developed from resource managers with the analytical capabilities of a GIS. ASPENEX consists of four major software components: the GIS, the expert system, the control program, and communications.

The fall issue of AI Applications in Natural Resource Management will contain a full explanation of the system in the paper "ASPENEX: An Expert System Interface to a Geographic Information System for Aspen Management" by William White and Bruce Morse.

INTEGRATED RESOURCE MANAGEMENT AUTOMATION - IRMA - Natural resource managers are currently assisted by data base management systems which handle their textual and numeric data; geographic information systems which handle their spatial data; and simulation models which provide predictions. More recently, expert systems are being utilized to handle the knowledge of resource experts.

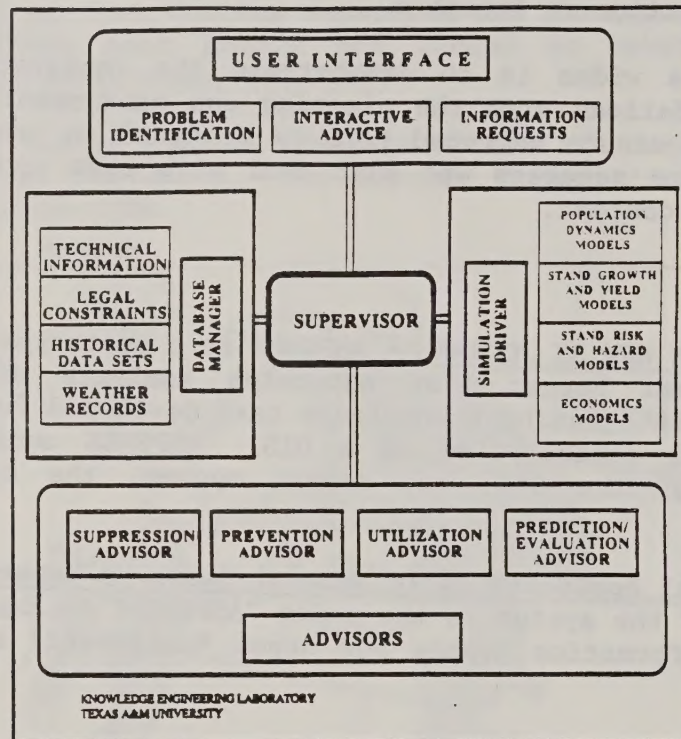
The Nicolet National Forest is using these advanced technology tools in developing, implementing, and monitoring their Forest Plan. In addition, Region 9 has introduced Integrated Resource Management (IRM) as an automated approach to monitoring implementation of forest plans.

One shortfall of employing these new tools, including IRM, has been the lack of automated integration. Without an integrating system, some of the advantages of these technologies, such as speed and completeness in decisionmaking, may be lost.

The IRMA project is addressing this shortfall. Cooperators from USDA Forest Service, Methods Application Group; WO/Land Management Planning and WO/Timber Management; U.S. Fish and Wildlife Service; Fort Collins Computer Center; Texas A&M University; and the University of Minnesota are assisting the Nicolet National Forest in developing a prototype integrating system for Region 9.

For additional information contact Peg Watry, IRMA Project Manager, Nicolet National Forest, Rhinelander, WI (715) 362-3415.

PROGRESS REPORT OF THE SOUTHERN PINE BEETLE EXPERT SYSTEM - The goal for the Integrated Southern Pine Beetle Expert System (ISPBEX) is to implement an integrated expert system for use in forest management problem solving and decisionmaking relative to actual or predicted depredations associated with the southern pine beetle. ISPBEX contains four separate advisors including: suppression, prevention, prediction/evaluation, and utilization (Figure 1). During FY 1987 major emphasis was placed on development of the Suppression Advisor. It is currently being refined during field testing at the Forest Pest Management Field Offices in Alexandria and Asheville. In FY 1988 cooperators will prototype the prediction/evaluation and prevention advisors.



SENSITIVITY ANALYSIS OF ROOT DISEASE MODEL - The western root disease model, recently developed through joint efforts by research scientists, forest pest management specialists, and modelers in the USA and Canada, can be used to predict effects of either *Phellinus weirii* or pathogenic *Armillaria* spp. on forest stands under various management regimes. A keyword system allows users to input root disease inventory data, remove stumps, modify pathogen behaviors, and activate windthrow or bark beetle attacks. At present, the model is attached to the Northern Idaho/Western Montana and South Central Oregon/Northeast California variants of Prognosis which reside at the Fort Collins Computer Center. Validation testing, sensitivity analysis, development of a user interface program, and adaptation of the model to other western areas of the United States are in progress.

There are 25 KEYWORDS that control the components of the root disease model and 58 parameters which can be specified by the user.

A sensitivity analysis of the root disease model will answer some questions about adequacy and accuracy by identifying the parameter to which the model responds most dramatically. The stochastic elements in the model can be used to produce estimates of variation in the model through replicated runs of the same parameter set.

MAG began such an analysis in October. The parameters related to the root disease inventory option, RRINIT, are being tested first. We hope to be ready to write a report on the sensitivity of the model and begin to revise the users manual, which is now in draft form, by the end of December.

FOREST IMAGE BASE SYSTEM (FIBS) - FIBS, developed at the University of Arizona, is a computer-based tool for retrieving and displaying forest images. It is a package of software programs and procedures designed to run interactive retrieval/viewing sessions from a personal computer linked to a laser disk. The objective of FIBS is to allow the user to view photos of a selected site in order to remove the abstraction from the planning and decisionmaking in natural resource management. By providing a visual image of a forest site rather than the current method of viewing site data only, the user is equipped with a more concrete evaluative and planning tool.

This prototype software package is currently accessing a laser disk containing 1550 inventoried ponderosa pine sites. FIBS will allow the user to find "visual matches" (slides) based on specified timber stand characteristics, e.g., trees per acre per size class, vegetative ground cover, or downed wood.

RESOURCE TECHNOLOGY 88 - International Symposium on Advanced Technology in Natural Resource Management - Resource Technology 88 is a unique forum, bringing together for the first time science, industry, education, and resource agencies to explore the opportunities of space-age technology as solutions to world resource problems. The four-day symposium offers introductory technology workshops, scientific papers on the latest application of new technology, industry exhibits of new technology, and panel discussions on the issues and opportunities of new technology in natural resource management.

Resource Technology 88 will be held in Fort Collins, Colorado, June 20-23, 1988. For additional information return the attached Information Request Form.

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Please return this request for information to:
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